

Course Code	Course Name	Teorical	Practice	Laboratory	Credits	ECTS
MAT102	CALCULUS II	3.00	2.00	0.00	4.00	7.00
Course Detail						
<b>Course Language</b>	: English					
<b>Qualification Degree</b>	: Bachelor					
<b>Course Type</b>	: Compulsory					
<b>Preconditions</b>	: Available					
<b>Objectives of the Course</b>	: The aim of this course is to teach basic mathematical concepts used in engineering science.					
<b>Course Contents</b>	: Functions of Several Variables, Limits, Continuity, Partial Derivatives, Chain Rule, Implicit Differentiation in higher dimensions., Gradient, Directional Derivatives, Extreme Values, Second Partial Derivative Test, Lagrange Multipliers, Extreme Value Problems, Multiple Integral, Fubini's Theorems, Iterated Integrals (Reversing Order of Integration) Double Integrals in Polar C., Triple Integrals in Spherical, Cylindrical C., Vector Calculus: Dot and Cross Products, Curl, Divergence, Line Int. along Arc, Parametrized Curves, Conservative Vector Fields, Path Independence, Potential Function. Theorem of Line Integral, Green's Theorem, Divergence Theorem, Stoke's Theorem, Sequences, Series, nth-term Test for divergence, Convergence Tests for Positive Power Series Absolute Convergence, Conditional Conv., Alternating S., Power S., Radius of Conv., Taylor Series and MacLaurin Series, Functions as Power Series					
<b>Recommended or Required Reading</b>	: 1) "Thomas' Calculus", 11/E G.B Thomas, M.D.Weir, J.Hass, F/R.Giordano, 2) "Stewart's Calculus: Early Transcendental" James Stewart 3) "Calculus: A Complete Course" (6th Edition) Robert Adams					
<b>Planned Learning Activities and Teaching Methods</b>	: Face to face, interactive and student-centered education					
<b>Recommended Optional Programme Components</b>	: To succeed at MAT101-CALCULUS 1					
<b>Instructors</b>	: Assoc. Prof. Dr. Sıla Övgü Korkut Uysal					
<b>Instructor's Assistants</b>	: None					
<b>Presentation Of Course</b>	: Face to face presentation					
<b>En Son Güncelleme Tarihi:</b>	: 7/18/2024 11:02:26 PM					

## Course Outcomes

## Upon the completion of this course a student :

1 will be able to explain the concepts of sequences and series and test the convergence of them

2 will be able to state the power series forms for any given analytic function and investigate the radius of convergence of it

3 will be able to identify functions of several variables, will be able to explain partial derivatives, and apply chain rule and implicit differentiation with the use of partial derivatives, will be able to calculate the extreme values of functions of several variables and solve the applied optimization problems

4 will be able to categorize the multiple integrals and evaluate them by using various techniques

5 will be able to describe vector calculus, identify the conservative-nonconservative vector fields, will be able to compute the line integral over the arc, and to distinguish if Green's theorem, line parametrization, and/or the fundamental theorem of line integral can be used or not.

## Preconditions

Course Code	Course Name	Teorical	Practice	Laboratory	Credits	ECTS
MAT101	MATEMATİK I	3.00	2.00	0.00	4.00	7.00

Weekly Contents						
	Teorical	Practice	Laboratory	Preparation Info	Teaching Methods	Course Learning Outcomes
1.Week	*The concepts of Sequences & Series The concepts of convergence of a series Special Series: Geometric & Telescoping series	*Exercises on The concepts of Sequences & Series The concepts of convergence of a series Special Series: Geometric & Telescoping series	*-		*Face to face and interactive education	
2.Week	*nth term test for divergence Tests for positive Series: Integral test p-series test Comparison tests: Direct ve Limit Ratio Testi Root Testi	*Exercises on nth term test for divergence Tests for positive Series: Integral test p-series test Comparison tests: Direct ve Limit Ratio Testi Root Testi			*Face to face and interactive education	
3.Week	*Alternating Series Test.: The concepts Absolute and Conditionally convergence Alternating series test	*Exercises on Alternating Series Test.: The concepts Absolute and Conditionally convergence Alternating series test			*Face to face and interactive education	
4.Week	*Introduction to Power series, Derivative, Integration for Power series and changing index of a Power series, Investigation of Radius of convergence in Power series	*Introduction to Power series, Derivative, Integration for Power series and changing index of a Power series, Investigation of Radius of convergence in Power series			*Face to face and interactive education	
5.Week	*Interval of Convergence of Power series	*Exercises on the interval of convergence of Power series			*Face to face and interactive education	
6.Week	*Taylor & Maclaurin series Expressing an analytic fuction as a series	*Exercises on Taylor & Maclaurin series Expressing an analytic fuction as a series			*Face to faceand interactive education	
7.Week	*Conservative vector fields, Potential function, Path independence,Fundamental theorem of line integral	*Exercises on Partial Derivatives, Chain Rule, Implicit Differentiation, Directional Derivative for functions of several variables			*Face to face and interactive education	
8.Week	*MIDTERM EXAM	*-				
9.Week	*Extreme values and Second derivative test, Lagrange multipliers, Extreme value problems	*Exercises on the Second derivative test, Lagrange multipliers and applied optimization problems			*Face to face and interactive education	
10.Week	*Introduction to the multiple integrals, Fubini's theorem Mutiple integrals on the rectangular region and on the general regions Polar transforms, integrals on the cicular regions	*Mixed exercises on the multiple integrals on all domains			*Face to face and interactive education	
11.Week	*Introduction to Vector calculus, Dot product and cross product, Vector field and derivative of the vector field	*Exercises on dot product, cross product, vector field and their derivatives			*Face to face and interactive education	
12.Week	*Parametrization of the curves, The line integral by using the line parametrization	*Exercises on the line integral using the line parametrization	*-		*Face to face and interactive education	
13.Week	*Conservative- nonconservative vector fields, Potential functions for conservative fields, path independence, Fundamental Theorem of the line integral	*Exercises on conservative vector fields, path independence, fundamental theorem of the line integral, and potential functions	*-		*face to face and interactive education	
14.Week	*Green's theorem for computing line integral on the closed curve.	*Exercises on Green's theorem and mixed problems on the line integral	*-		*Face to face and interactive education	

Assesment Methods %
5 Final : 50.000
6 Mdterms : 50.000

ECTS Workload			
Activities	Count	Time(Hour)	Sum of Workload
Vize / Midterms	1	2.00	2.00
Final / Final	1	2.00	2.00
Ders Öncesi Biresysel Çalışma / Individual study before lecture	13	2.00	26.00
Ders Sonrası Biresysel Çalışma / Individual study after lecture	15	4.00	60.00
Ara Sınav Hazırlık / Preparation for midterm	1	20.00	20.00
Final Sınavı Hazırlık / Preparation for final	1	18.00	18.00
Derse Katılım / Attending lectures	14	5.00	70.00

